

w/ JH Meds

## IGS BURNER MODIFICATION REPORT

### OUTLINE

Draft Report Due: **Sept 7, 1993** (10 days plus holiday weekend)  
Final Report Due: **Sept 17, 1993**

#### EXECUTIVE SUMMARY (<2 pages)

JKH

To address both Units 1 and 2  
Success and Failures

#### SECTION 1 - INTRODUCTION & HISTORY

JKH

##### HISTORY

How we got here (acceptance test setup)  
B&W Warranty considerations  
Project installing T/C's

##### INSPECTIONS

History of degradation

##### PURPOSE OF PROJECT (why)

→ Unit descriptions  
Resolve mechanical degradation of burners  
(was not to address and improve combustion)

##### GOALS

Address and resolve problems  
Not to cause operational problems

##### EXPECTED RESULTS (what we wanted)

Resolution of overheat problems  
Possible combustion improvements

#### SECTION 2 - PROJECT DEVELOPMENT

JHN

##### B&W INVOLVEMENT

Air Register Set-up Philosophy  
Out of service operation versus in-service  
Beef up existing design, no engineering evaluation  
Windbox measurement was solution to all problems

##### EER INVOLVEMENT

##### NEWKIRK INVOLVEMENT

##### RJM INVOLVEMENT

IP7\_004069

Aerodynamic evaluation  
Swirl Numbers  
Burner Balancing  
Flame Stabilizers  
Finite Element Analysis  
Petaled Back Plate Design

IPSC INVOLVEMENT  
Fuel Balancing

### SECTION 3 - PERFORMANCE RESULTS

AEN

LOI Levels (original range)  
NOx Levels  
    (explain NOx and LOI relationship)  
Eyebrow Formation/ Ash Fusion Temperatures  
Burner Front Temperatures  
Flame Stability/ Scanners Operation  
Combustion Stability (turndowns)  
Burner Physical Inspections

?What didn't do:  
    clinkers, drum level, CO, LOI, NOx  
?AGASS Profiles??  
?Economizer Temperature Profiles??

### SECTION 4 - CONCLUSIONS & RECOMMENDATIONS

AEN

#### CONCLUSIONS

Burner Physical Integrity is good  
    Modifications were effective  
    Long life is expected  
        (U2 changeout not expected in foreseeable future)  
Design looks good  
Still Some Coal Nozzle Flaring  
Burner Line Fires

Stabilizers were effective  
    Didn't cause catastrophic problems  
        (didn't burn or plug up)  
    Pushed flame out from burner  
    Holds stable flame thru load range  
    Corrected aerodynamic deficiencies of B&W design  
    Allowed effective setup of air registers

Secondary Air Balancing was effective  
    Shrouds and backplate settings allowed balancing on  
        outer and inner air to all 48 burners  
Outer air doors control spin not volume  
Inner burners are not starved for cooling air

Fuel Flow Balancing was effective  
Fuel line balancing also helped on temperature profile

Backplate temperature have not been measured lowered  
Plus thermocouple concerns

Unit performance, NOx, LOI's are about the same or better

Economic Impact

How much cost and how much saved

What did RJM save us versus B&W design recommend

#### RECOMMENDATIONS

Continue to maintain stabilizers (keep)

No burner replacement for Unit 2 at this time, without petal back plate warpage may occur in the future and replacement may be required.

Continued periodic inspections

More investigative testing on flame front position  
to address coal nozzle flaring

More analysis into burner line aerodynamics  
to address burner line fires

More testing with non-directional velocity probe  
on fuel flow lines

**ATTACHMENTS** (poundage factor) Reference attachments in body of report!!!!

BURNER INSPECTION REPORTS/ PICTURES

TEST RESULTS

EER REPORT

NEWKIRK REPORT

RJM REPORT

B&W CORRESPONDENCE

Note: Be concise in writing, remember each section that you write is not a stand alone document. All of the sections are needed to paint the whole picture. Try to stick to the point of view that you are writing. If you think of something that needs to be said that would best be covered in another section, write it and send electronically to the person covering that section. It is actual easier to add verbage to a report than to delete. When alot has be deleted because of redundancy, it becomes choppy and incoheren